

- 1 -

## A FENCE PANEL

## FIELD OF THE INVENTION

5 The present invention relates to fencing and more particularly to a fence panel, method for assembling a fence panel, method for installing a section of fence and a frame element for assembling a fence panel.

## 10 BACKGROUND OF INVENTION

Suburban properties are often fenced to provide the property owner with increased privacy and security. One of the more popular types of fencing used is timber fencing  
15 having a wooden framework to which pine palings are securely fastened. The framework includes vertical fence posts that are anchored in the ground for support and a series of rails attached between each adjacent pair of posts. There are typically two or three evenly spaced  
20 wooden rails between each pair of posts; the rails extending horizontally between posts.

The palings are fastened in a vertical orientation, one by one, to one side of the frame by nailing or stapling each  
25 paling to the wooden rails using specialised pneumatic equipment. Adjacent palings overlap to minimise gaps in the fence which can result when the palings do not have straight edges. During fence installation, a plinth board is attached to the base of two adjacent posts and the  
30 palings are then fastened to the frame with their lower ends resting on this board. After fastening, the top ends of the palings are trimmed together to produce a completed fence of desired height.

35 Accordingly, it will be appreciated that timber fencing is relatively labour intensive to install. In addition, the side of the fence on which the palings are fastened is

- 2 -

aesthetically more pleasing to the eye than the side on which the rails are visible. The rails also provide a means by which people can scale the fence. For example, intruders can use the rails to gain access to a property or children can climb the rails at the risk of hurting themselves by falling. A further problem with this fencing technique is that disputes often arise between neighbouring property owners as to which side of the fence the railings will be visible.

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## SUMMARY OF INVENTION

According to one aspect of the present invention, there is provided a fence panel comprising:

- 15           at least one frame element having a plurality of first fasteners and a plurality of second fasteners;  
            a plurality of first palings respectively fastened to a first side of said at least one frame element by said plurality of first fasteners; and  
20           a plurality of second palings respectively fastened to a second side of said at least one frame element by said plurality of second fasteners.

According to a further aspect of the present invention, there is provided a section of fence comprising:

- 25           two adjacent fence posts;  
            at least one frame element between said two adjacent fence posts having a plurality of first fasteners and a plurality of second fasteners;  
30           a plurality of first palings respectively fastened to a first side of said at least one frame element by said plurality of first fasteners; and  
            a plurality of second palings respectively fastened to a second side of said at least one frame  
35           element by said plurality of second fasteners.

According to a further aspect of the present invention,

- 3 -

there is provided a gate comprising:

at least one frame element having a plurality of first fasteners and a plurality of second fasteners;

5 a plurality of first palings respectively fastened to a first side of said at least one frame element by said plurality of first fasteners; and

a plurality of second palings respectively fastened to a second side of said at least one frame element by said plurality of second fasteners.

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According to a further aspect of the present invention, there is provided a method for assembling a fence panel comprising the steps of:

15 providing at least one frame element having a plurality of first fasteners and a plurality of second fasteners;

respectively fastening a plurality of first palings to a first side of said at least one frame element using said plurality of first fasteners; and

20 respectively fastening a plurality of second palings to a second side of said at least one frame element using said plurality of second fasteners.

25 According to a further aspect of the present invention, there is provided a method for installing a section of fence between two adjacent fence posts comprising the steps of:

30 assembling at least one fence panel, each fence panel being assembled by providing at least one frame element having a plurality of first fasteners and a plurality of second fasteners, respectively fastening a plurality of first palings to a first side of said at least one frame element using said plurality of first fasteners, and respectively fastening a plurality of second palings to a second side of said at least one frame element using plurality of said second fasteners;

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situating said at least one fence panel between

- 4 -

said two fence posts;

attaching a pair of top rails to an upper portion of each fence post wherein said at least one fence panel is compressed between said pair of top rails; and

5 attaching a pair of bottom rails to a lower portion of each fence post wherein said at least one fence panel is compressed between said pair of bottom rails.

10 According to a further aspect of the present invention, there is provided a frame element for assembling a fence panel, said fence panel comprising at least one said frame element, a plurality of first palings fastened to a first side of each frame element and a plurality of second  
15 palings fastened to a second side of each frame element, said frame element comprising:

a plurality of first fasteners for respectively fastening said plurality of first palings to said first side; and

20 a plurality of second fasteners for respectively fastening said plurality of second palings to said second side.

#### BRIEF DESCRIPTION OF DRAWINGS

25 A preferred embodiment of the invention will now be described in relation to the accompanying drawings, wherein:

30 Figure 1A shows a frame element according to a first embodiment of the present invention;

Figure 1B shows a plan view of the frame element shown in Figure 1A;

35 Figure 2A shows a partially exploded view of a fence panel according to a first embodiment of the present invention;

- 5 -

Figure 2B shows a side view of the fence panel of Figure 2A prior to assembly;

- 5 Figure 3 shows a fence panel installed in a section of fence between two adjacent fence posts according to a first embodiment of the present invention;

10 Figure 4 shows a frame element according to a second embodiment of the present invention;

Figure 5 shows a partially assembled fence panel according to a second embodiment of the present invention;

- 15 Figure 6 shows a method for installing a section of fence according to a second embodiment of the present invention;

20 Figure 7 shows a fence panel according to a third embodiment of the present invention; and

Figure 8 shows a fence panel according to a fourth embodiment of the present invention.

#### DESCRIPTION OF PREFERRED EMBODIMENT

- 25 According to a first embodiment of the present invention, there is provided a frame element 1 for assembling a fence panel 5 as shown in Figure 1. The frame element 1 is produced by punching teeth into a strip of galvanized
- 30 sheet steel having a substantially rectangular cross-section. The frame element 1 comprises a plurality of first teeth 3 and a plurality of second teeth 2. Each first tooth 3 is a tapered spike projecting laterally from the frame element 1 whereas each second tooth 2 is a
- 35 pointed spike which is hooked or bent. The first teeth 3 and second teeth 2 are formed by punching the frame element 1 from one side only.

- 6 -

The frame element 1 has sixteen first teeth 3 arranged in four first sets 7 which are evenly spaced along the frame element 1 in a longitudinal direction, each first set 7 comprising four first teeth 3 and forming a first fastener. In addition, the frame element 1 has twelve second teeth 2 arranged in four second sets 6 which are also evenly spaced along the frame element 1 in a longitudinal direction, each second set 6 comprising three second teeth 2 and forming a second fastener (Figure 1). The first sets 7 are longitudinally offset along the frame element 1 with respect to the second sets 6 wherein there is a first set 7 centrally located between each pair of adjacent second sets 6 and vice-versa.

Figure 2 shows four first wooden palings 4 and four second wooden palings 8 arranged with respect to three frame elements 1 of the fence panel 5. The first palings 4 are of a first width and the second palings 8 are of a second width different to the first width. The frame elements 1 are aligned parallel to each other and evenly spaced apart. The four first palings 4 are arranged in parallel with a first gap 26 between each pair of adjacent first palings 4. Each first paling 4 is positioned so as to be centered over a respective first set 7 of first teeth 3 for each frame element 1. The four first palings 4 are fastened to a first side 22 of the frame element 1 by pressing the plurality of first teeth 3 into the plurality of first palings 4. Each first tooth 3 in a first set 7 thereby penetrates a first paling 4 and, in doing so, securely fastens the first paling 4 to the first side 22 of the frame element 1.

The four second palings 8 are also arranged in parallel such that there is a second gap 28 between each pair of adjacent second palings 8. Each second paling 8 is centrally positioned over a respective second set 6 of

- 7 -

second teeth 2 for each frame element 1. The second palings 8 are fastened to the second side 24 of the frame element 1 by pressing the second teeth 2 into the second palings 8. Applying pressure to the peak of the hooked second teeth 2 causes them to bend and penetrate the second palings 8 thereby fastening the second palings 8 to the second side 24 of the frame element 1. Each first set 7 of first teeth 3 for a given frame element 1 penetrates a separate first paling 4 and similarly each second set 6 of second teeth 2 for a given frame element 1 penetrates a separate second paling 8.

Figure 3 shows a single fence panel 5 installed in a section of fence between two adjacent fence posts 10. A plinth board 16 is attached to the base of each fence post 10. A bottom rail 14 is attached to a lower portion of each fence post 10 and abuts the plinth board 16. The bottom rail 14 has a slot 18 for accommodating the bottom end of the fence panel 5 wherein the lower ends of the palings 4,8 are inserted into the slot 18. A top rail 12 is attached to an upper portion of each fence post 10 and also has a slot 18 for accommodating the top end of the fence panel 5. The top ends of the palings 4,8 of the fence panel 5 are situated in the slot 18 of the top rail 12. The rails 12, 14 thereby support each fence panel 5.

The fence panel 5 is thereby aligned in an upright position and in a straight line between the two fence posts 10, with the three frame elements 1 being substantially parallel to the ground (and each other) and the palings 4, 8 being substantially vertical. The bottom rail 14 and top rail 12 therefore provide an alignment means for aligning any number of fence panels 5 in a straight line between two adjacent fence posts 10. A plurality of fence panels 5 would typically be installed between two adjacent fence posts 10 to form a section of fence and a fence is formed by installing a plurality of

- 8 -

sections of fence in this way.

The fence panels 5 would typically be pre-fabricated in a factory where their assembly is automated by arranging the frame elements 1 and palings 4,8 in a correct orientation and then using a press to press them together in order to fasten the first palings 4 and second palings 8 to the frame elements 1. Alternatively, the fence panels 5 can be assembled on site manually using a hammer. The fence panel 5 may be formed by respectively fastening the first palings 4 and second palings 8 to the frame element 1 either separately or concurrently. Installing a fence using pre-fabricated fence panels 5 is quicker, less labour intensive and involves using less materials than constructing fences according to known methods, thereby offering a more cost effective fencing alternative.

In addition, the first gaps 26 and second gaps 28 of the fence panel 5 would typically be small enough such that a human foot cannot be inserted between adjacent first palings 4 or second palings 8 respectively. In this manner, a small child or intruder cannot get a footing on the frame element 1, thereby impeding them from scaling an erected fence. The frame element 1 would also be largely obscured from view by the first palings 4 and second palings 8 on either side of the fence and therefore be more aesthetically pleasing to look at than conventional timber fences. Further, as the frame element 1 has a relatively thin cross section, is not as unsightly as conventional fence rails.

It is further apparent that a viewer on one side of the fence cannot look through the gaps to see through the fence to the other side owing to the overlapping nature of the palings. Each first gap 26 is in register with a second paling 8 whereby a person looking through a first gap 26 has their view impeded by a second paling 8.

- 9 -

Similarly, each second gap 28 is in register with a first paling 4 whereby a person looking through a second gap 28 has their view impeded by a first paling 4. The first and second palings 4,8 are thus arranged in an overlapping relationship with one another, thereby resisting the flexion of the frame elements 1. In this embodiment, each first paling 4 overlaps all neighbouring second palings 8.

According to a second embodiment of the present invention, there is provided a frame element 1 comprising ten first teeth 3 and ten second teeth 2 as shown in Figure 4. The frame element 1 is formed from a steel sheet strip having a thickness of 1mm thereby contributing to the relative light weight of the completed fence panel 5, and although reasonably flexible on its own, each frame element 1 derives an increased degree of longitudinal rigidity when the palings 4, 8 are attached to the frame element 1. The first teeth 3 and second teeth 2 are both hooked or bent type teeth and are formed by punching both sides of the frame element 1 respectively. There are provided five first sets 7 each comprising a pair of first teeth 2 and five second sets 6 each comprising a pair of second teeth 2. Each first set 7 forms a first fastener and each second set 6 forms a second fastener. The second sets 6 are longitudinally offset along the frame element 1 with respect to the first sets 7 such that there is a first set 7 centrally positioned between each adjacent pair of second sets 6.

The frame element 1 has an attachment means 20 at either end which can be used to attach fence panels together or to fence posts 10. The attachment means 20 can be connected to a fence post 10 either directly or via alternate attachment means attached to the fence post 10. Figure 5 shows a partially assembled fence panel 5 according to a second embodiment of the present invention comprising two frame elements 1 which can be assembled in

- 10 -

a similar fashion to the fence panel 5 of the first embodiment. The wooden first palings 4 and wooden second palings 8 are of the same width and therefore the first gaps 26 and second gaps 28 are also of the same width.

- 5 The attachment means 20 provide a means by which each fence panel 5 can be attached at either side edge, to either a fence post 10 or another fence panel 5.

- 10 The attachment means 20 of a first fence panel 5 can be bolted to a corresponding attachment means 20 of a second fence panel 5, thereby attaching the first fence panel to the second fence panel. A number of fence panels may be attached in this manner with the two fence panels 5 at either extreme being attached to a different fence post
- 15 10. A pair of top rails 30 may be attached to an upper portion of each fence post 10 thereby compressing the attached fence panels 5 between the pair of top rails 30 (Fig. 6). Similarly, a pair of bottom rails 32 can be attached to a lower portion of each fence post 10 thereby
- 20 compressing the attached panels 5 between the bottom rails 32. Steel elbow brackets 34 may be used for attaching the top rail 30 and bottom rail 32 to the fence posts 10.

- 25 The attached fence panels 5 need not be attached to the fence posts 10 and may instead be supported by the top rails 30 and bottom rails 32 only. In addition, the adjacent fence posts 10 could be spaced so that only a single fence panel 5 fits between them.

- 30 According to a third embodiment of the present invention, there is provided a fence panel 1 comprising a singular tubular frame element 1. The frame element 1 may be bent into a "Z" shape as shown in Fig. 7 and would be particularly suitable for forming a gate. The frame
- 35 element 1 would comprise a plurality of first and second fasteners on first 22 and second 24 sides of the frame element 1 respectively. Each fastener would typically

- 11 -

comprise a plurality of teeth, each tooth being a spike extending from the frame element 1 for penetrating the palings 4, 8 during fastening.

5 A fourth embodiment of the present invention is shown in Fig. 8. The first gap 26 and second gap 28 are greater than the width of the second paling 8 and first paling 4 respectively. Each frame element 1 has a circular cross-section although, alternatively, could be of the type  
10 described in either the first or second embodiments. The first palings 4 and second palings 8 are inclined as indicated. As in the previous embodiments, the frame elements 1 would comprise a plurality of first and second fasteners on first 22 and second 24 sides of the frame  
15 element 1 respectively.

Additional variations and embodiments of the present invention will be apparent to a person skilled in the art.

20 The frame element 1 of the first and second embodiments was formed from a steel strip of fasteners with each fastener comprising a plurality of teeth. While less preferred, the frame element may have no teeth and instead, the fasteners may be formed from bolts which  
25 protrude through holes in the palings 4, 8 wherein the palings 4, 8 are fastened to the frame element 1 with a nut. Furthermore, the palings 4, 8 would preferably be wooden although could alternatively be made from fibre board, metal or plastics materials. The steel strip used  
30 to form the frame element 1 could be any sheet metal including aluminium, galvanised steel or any or other like material.

It will be appreciated by those skilled in the art that a  
35 fastener need only comprise a single tooth 2, 3. Increasing the number of teeth 2, 3 per fastener has the benefit of further resisting the flexion of each frame

- 12 -

element 1 about the faster although also requires a greater pressing force when fastening the palings 4, 8 to the frame element 1. Various configurations of teeth 2, 3 can be selected so as to strike a balance between the flexion of the frame elements 1 and the pressing force required to fasten the palings 4, 8 to the frame elements 1.

The type of teeth 2, 3 shown in the various embodiments were by way of example only and any similar means for fastening the palings 4, 8 to the frame elements 1 could be alternatively used. The arrangement of the teeth sets 6, 7 could also be varied, and the first palings 4 and second palings 8 could be co-incident with one another wherein a viewer looking through the gaps 26, 28 does not have their view impeded by a paling 4, 8.

The teeth 2, 3 in the embodiments would typically not protrude from the face of the palings 4, 8 when the palings 4, 8 are fastened to the frame elements 1. In a further embodiment, the teeth may protrude from the face of the palings 4, 8 and can then be bent over for improved fastening strength.

The fence panels 5 indicated in the preferred embodiments comprise a plurality of first palings 4 and second palings 8 which were substantially vertical to the ground when the panels were installed upright in the fence. In another embodiment of the present invention, the palings 4, 8 could be oriented such that their edges are angled at 45° from the ground (and therefore the frame elements 1) or substantially horizontally. In addition the first palings may be at 45° and the second palings may be at 135° thereby giving a criss-cross effect. In addition, the frame elements 1 could be oriented at any angle relative to either the palings 4, 8 or the ground.

- 13 -

In the second embodiment of the present invention, the attachment means 20 was provided at either end of the frame element 1. In an alternative embodiment, the attachment means need only be present at one end of the frame element 1, or indeed need not be present at all wherein two frame elements may be welded or bolted directly together. The attachment means 20 could additionally be replaced by any other clamping, clasping or other like attachment means.

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The first embodiment described a section of fence wherein the ends of both the first palings 4 and second palings 8 were accommodated by a slot 18. In an alternative embodiment, the slot need only be wide enough to accommodate either the first palings 4 or second palings 8 of the fence panel 5, but not both.

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In a further embodiment, each frame element 1 may consist of a pair of sub-frame elements having fasteners on one side only. The sub-frame elements may then be fastened together in pairs, with their respective fasteners arranged in mutually opposite directions.

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These and other modifications may be made without departing from the ambit of the invention, the nature of which is to be determined from the foregoing description.

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